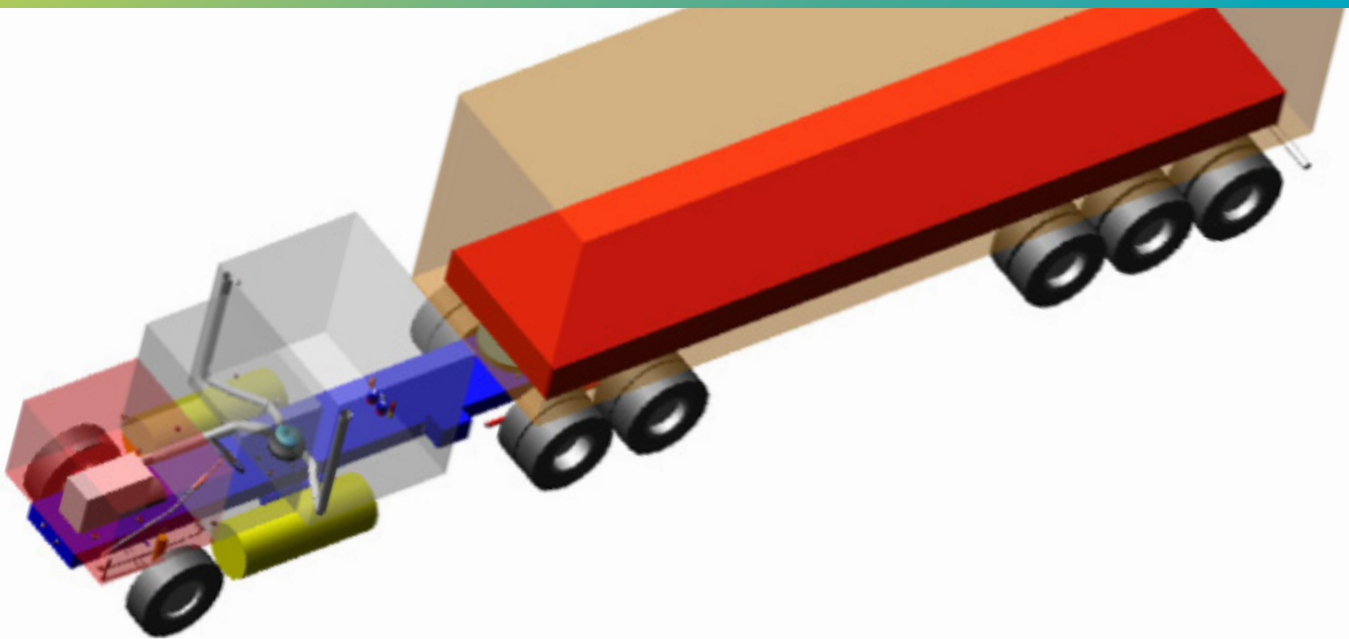


Simulating fatigue cracking in heavy-duty trailers

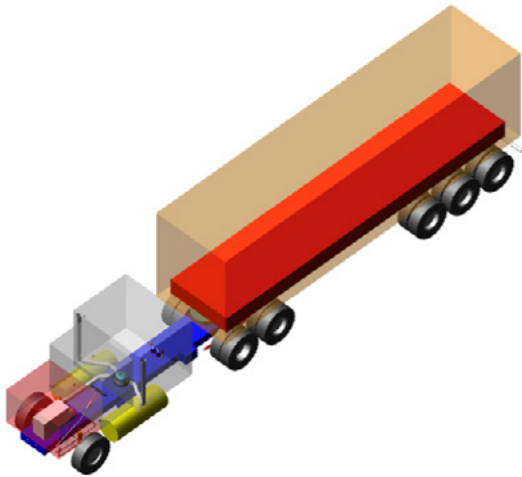
With Adams Car, students were able to simulate a trailer model for different driving cases as well as road conditions such as potholes to better understand and analyze fatigue cracking occurring in heavy-duty trailers.



Adams Car eliminates the need to derive and solve the governing equations of the multibody dynamic systems. This results in significant reduction in time spent on calculations.

Monash University is a public research university based in Melbourne, Australia. Students from the University's Department of Mechanical and Aerospace Engineering undertook a project to understand and analyze fatigue cracking occurring in heavy-duty trailers.

To gain a comprehensive understanding of the process of fatigue cracking, the students needed to simulate the trailer model under different driving cases such as maintaining, braking, accelerating, and cornering at different speeds and specific parameters. Also, they needed to study the behaviour for different road conditions, including potholes.



Investigating dynamic behaviour of trailer models

As a first step, the team undertook the fundamental work of investigating the dynamic behaviour of semi-trailer models under various driving scenarios. The whole vehicle model was used, including all the parts of the tractor and semi-trailer models.

In order to understand the impact of different types of potholes in real life, they needed to simulate various road profiles. Therefore, they developed road profiles with different pothole geometries for the simulation process.

Given the requirements at hand, Adams Car was the first proposed tool for this project. The team used Adams Car to design and realize the simulations.

Further, the outputs were applied to fatigue analysis for improving the trailer's structure. When these inputs were used for machine learning models, the team was able to make predictions of the dynamic behaviour with different input parameter values.

Better understanding in shorter time

Adams Car eliminates the need to derive and solve the governing equations of the multibody dynamic systems. This results in significant reduction in time spent on calculations. Additionally, this also helps eliminate possible errors that might crop up during complex calculations.

By developing the model with essential components, the team was able to get a much better understanding of the structures as well as the relationship between different components.

Adams also provides a broad range of shared databases, which afford a tremendous convenience when it comes to understanding, modifying, or developing new models.

The team also benefited greatly from MSC Software's 24-hour hotline service. As a part of this, the students had access to specific professional staff members based on the nature of the queries. This helped the students to better understand and resolve problems.

Key highlights:

Product: Adams Car

Industry: Automotive

Benefits:

Adams Car helps students eliminate the need to derive and solve the multibody dynamic systems' governing equations and eliminate possible errors during complex calculations.



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Our technologies are shaping urban and production ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

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